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UNITED STATES COURT OF APPEALS  
FOR THE FEDERAL CIRCUIT

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ARTHROCARE CORPORATION,

*Plaintiff/Counterclaim Defendant*  
*Appellee,*

and

ETHICON, INC.,

*Counterclaim Defendant-Appellee,*

v.

SMITH & NEPHEW, INC.,

*Defendant/Counterclaimant-Appellant,*

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Appeal from the United States District Court for the District of Delaware in  
Case No. 01-CV-504, Chief Judge Sue L. Robinson

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**COMBINED PETITION FOR PANEL REHEARING AND REHEARING  
EN BANC BY PLAINTIFF/COUNTERCLAIM DEFENDANT-APPELLEE  
ARTHROCARE CORPORATION**

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## **CERTIFICATE OF INTEREST**

Counsel for Plaintiff/Counterclaim Defendant-Appellee ArthroCare Corporation certifies the following information in compliance with Rule 26.1 of the Federal Rules of Appellate Procedure and Rules 26.1 and 47.4 of the Federal Circuit Rules, and in satisfaction of Rule 12(b) of the Federal Rules of Appellate Procedure requiring a Representation Statement:

1. The full name of every party represented by me is: ArthroCare Corporation.
2. The names of the real parties in interest represented by me are the same as those identified in paragraph 1 above.
3. All parent corporations and any publicly held companies that own 10% or more of the stock of the party represented by me are: None.
4. The names of all law firms and the partners or associates that appeared for the party now represented by me in the trial court or agency or are expected to appear in this Court are:

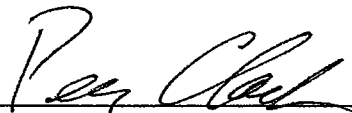
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Dated: May 21, 2004

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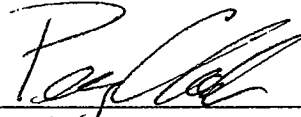
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## **STATEMENT OF COUNSEL**

Based on my professional judgment, I believe that the panel decision is contrary to the following precedents of this Court: *WMS Gaming, Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1348 n.2 (Fed. Cir. 1999) (where “neither party disputes [the District Court’s] construction on appeal, we decline to raise an issue *sua sponte* that the parties have not presented”).

Dated: May 21, 2005

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**POINTS OF LAW AND FACT OVERLOOKED OR MISAPPREHENDED  
BY THE COURT**

1. The Court made a material error in reversing the jury's verdict that the '536 Patent is not anticipated by overlooking that the asserted claims of the '536 Patent require an "electrically conducting fluid supply" *outside* the patient's body "for directing electrically conducting fluid to the target site" *in addition to* requiring that the "electrically conducting fluid generate[] a current flow path" *inside* the patient's body.

2. The Court overlooked and misapprehended the District Court's unchallenged claim construction of "electrically conducting fluid" and improperly substituted and applied its own *sua sponte* claim construction.

3. The Court misapprehended the standard of review governing appeals from the denial of a Rule 50 motion by, among other things, improperly weighing the evidence, deciding disputed facts, and combining two prior art references to find anticipation.

4. The Court misapprehended its role as a reviewing court and improperly vacated the injunction, even though it affirmed the jury's verdict that Smith & Nephew infringed the '882 Patent and the '592 Patent.



## **ARGUMENT IN SUPPORT OF REHEARING**

### **I. The Court Overlooked That The '536 Patent Requires An "Electrically Conducting Fluid Supply" Outside The Patient's Body**

The Court framed the issue of anticipation as whether the Roos References disclose an "electrically conducting fluid." Decision at 9. The Court focused its anticipation analysis on whether the fluid in the Roos References creates a current flow path between the active and return electrodes *inside the patient's body*. *Id.* at 9-12. In doing so, the Court overlooked that Claim 45 also requires that the fluid must be an electrically conducting *outside the patient's body*. Claim 45 provides in relevant part:

an electrically conducting fluid supply for directing electrically conducting fluid to the target site such that the electrically conducting fluid generates a current flow path between the return electrode and the electrode terminal. A399.

The District Court's unchallenged construction of the phrase "electrically conducting fluid supply" was "a medical container that stores electrically conducting fluid," which necessarily requires that the fluid be electrically conducting outside the patient's body. A17. ArthroCare specifically argued on appeal that the Roos References do not disclose an "electrically conducting fluid supply for directing electrically conducting fluid to the target site." ArthroCare's Br. at 27. The Court never addressed this limitation and never pointed to any clear and convincing disclosure in the Roos References that the fluid was electrically

conducting *before* it was delivered to the target site inside the patient's body. As a result, the Court's finding of anticipation violates Federal Circuit precedent which requires that an anticipating reference disclose each and every limitation of the asserted claims by clear and convincing evidence. *Koito Mfg. Co. Ltd. v. Turn Key Tech., LLC*, 381 F.3d 1142, 1151 (Fed. Cir. 2004).

None of the passages from the Roos References on which the Court relies provides clear and convincing evidence of an "electrically conducting fluid supply" outside the patient's body. In each case, the evidence before the jury fully supports the conclusion that the Roos References used fluid that was non-conductive outside the patient's body.

The statement in Claim 1 of the Roos Patent that there is a space between the electrodes that is "adapted to be filled with liquid to provide electrical conductance" is satisfied by a non-conductive fluid outside the patient's body that becomes more conductive once it mixes with secretions inside the patient's body. A later issued patent to Roos, the '667 Patent, made clear that the Roos Patent relied (unsuccessfully) on tissue secretions inside the body to make the electrically non-conducting fluid more conducting. A15517 (1365:25-1367:21); A23661 (1:14-29). Likewise, the statement in the Roos prosecution history that "there is always a well-defined current path . . . through the washing (and tissue) fluid" is consistent with the explanation in the Roos '667 Patent that secretions inside the

patient's body (*i.e.* tissue fluid) seeped into the delivered non-conductive fluid to make it more conductive.

The Court also relied on diagrams and text in the Roos Article describing "very good electrical conditions" and providing "the high-frequency a current path . . . offering such low resistance that aberrant currents or leakage currents do not even occur." Again, this is consistent with using secretions, such as blood, inside the body to increase the conductivity of the "irrigation liquid" that was non-conductive outside the body. The Roos Article states that Roos and Elsässer used their bipolar device inside the patient's body only *after* they had used a conventional monopolar device to make "initial cuts" in the patient's tissue in the presence of the "irrigation liquid." A18730. Because the evidence uniformly showed that monopolar TURP procedures were performed using non-conductive fluid, A15510 (1339:15-1340:5); A15512-13 (1348:7-1349:1); A15519 (1374:23-1375:12), this strongly supports the jury's inference that Roos did not disclose an "electrically conducting fluid supply" outside the patient's body for directing electrically conducting fluid to the target site."

Because this Court overlooked the "electrically conducting fluid supply" limitation of Claim 45, and because there was substantial evidence that an "electrically conducting fluid supply" was not disclosed in the Roos References, the jury's verdict of no anticipation should be affirmed.

## **II. The Court Overlooked And Misapprehended The Unchallenged Claim Construction Of “Electrically Conducting Fluid”**

The District Court construed “electrically conducting fluid” to mean “any fluid that facilitates the passage of electrical current. Examples of electrically conducting fluid are blood and saline.” A18. On appeal, Smith & Nephew did not challenge this construction. Nonetheless, this Court did not apply this construction. The Court’s decision never discusses or evaluates whether the “irrigation liquid” in the Roos References was capable of “facilitating the passage of electrical current.” Instead, the Court *sua sponte* defined an “electrically conductive fluid” as one that merely “provide[s] a path for the current” and evaluated the jury’s no anticipation verdict using its substituted claim construction. Decision at 12 (“the Roos and Elsässer article describes the liquid as providing a path for the current, thus serving as a conductive fluid”). This is improper.

By ignoring the District Court’s unchallenged claim construction, and substituting its own without briefing on the issue, this Court dangerously departs from its own precedent. *WMS Gaming, Inc. v. Int’l Game Tech.*, 184 F.3d 1339, 1348 n.2 (Fed. Cir. 1999) (where “neither party disputes [the District Court’s] construction on appeal, we decline to raise an issue *sua sponte* that the parties have not presented”). *WMS Gaming* reflects sound policy. It recognizes that the Court is not in a position to determine the proper meaning of claim terms when the parties have not briefed the issues and directed the Court to the relevant evidence.

None of the briefs, evidence, or argument on which the District Court decided claim construction was brought to the Court's attention. Had those materials been before this Court, it would have been clear why this Court's *sua sponte* construction is incorrect.

The most significant problem with this Court's construction is that it reads-out the words "electrically conducting" from the phrase "the electrically conducting fluid generates a current flow path." By defining "electrically conducting fluid" to mean "fluid that provides a path for the current," this Court rewrites Claim 45 to read: "the ~~electrically-conducting fluid~~ [fluid that provides a path for the current] generates a current flow path." This construction improperly conflates the claimed structure ("electrically conducting fluid") with the claimed function ("generat[ing] a current flow path") by defining the structure solely in terms of the function it performs. This violates this Court's prohibition on rendering claim terms meaningless under the guise of claim construction. *Playtex Prods., Inc. v. Procter & Gamble Co.*, 400 F.3d 901, 907 (Fed. Cir. 2005) (reversing District Court construction that "reads-out the essence" of a claim limitation).<sup>1</sup>

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<sup>1</sup> The Court's *sua sponte* construction also is erroneous because it effectively adopts the construction that Smith & Nephew proposed below – "fluid that allows the passage of electrical current" – that the District Court rejected and from which Smith & Nephew did not appeal. A7549.

This Court's new claim construction represents a material error because, had this Court given effect to the District Court's construction, there is substantial evidence that the Roos References do not disclose by clear and convincing evidence an electrically conducting fluid that "that facilitates the passage of electrical current." The Roos Patent mentions a fluid for "providing electrical conductance" and the Roos Patent prosecution history mentions a "current path" but, as Smith & Nephew's own expert admitted at trial, the non-conducting fluids conventionally used in TURP procedures (the procedure described in the Roos References), such as glycine and mannitol, can provide electrical conductance. A15519 (1374:23-1375:9); A15520 (1377:9-1378:1); A15510 (1340:6-10). Providing electrical conductance, which even non-conducting fluids do in electrosurgery, is not the same as "facilitating" current flow. Similarly, the Roos Article mentions providing "the high frequency current a path" and a current "directly flowing" through the fluid, but neither of these statements teaches that the current flow is greater than the flow of current through the numerous non-conductive fluids commonly used in electrosurgery.<sup>2</sup>

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<sup>2</sup> Both the Roos Patent and the Roos Article teach that non-conductive fluids used in electrosurgery provide current flow paths. A18720 (Figs. 2 & 3); A18676 (1:28, 1:52-56); A15517 (1366:17-20); A15519 (1374:23-1375:9); A15520 (1377:9-1378:1); A15510 (1340:6-10). Additional evidence before the District Court also established that a person of ordinary skill would have recognized that non-electrically conducting fluids can provide current pathways, even though they are not considered "electrically conducting fluids." See Addendum at A5956 (Pearce

Because the Court should not have applied its own *sua sponte* claim construction, and because there is substantial evidence supporting the verdict of no anticipation under the District Court's unappealed claim construction, the jury's verdict of no anticipation of the '536 Patent should be affirmed.

### **III. The Court Misapprehended Its Proper Role In Reviewing Smith & Nephew's Rule 50 Motion**

#### **A. The Court Improperly Weighed The Evidence And Decided Disputed Facts Contrary To The Jury's Verdict**

This Court improperly weighed evidence and decided at least three disputed facts contrary to the jury's verdict in this case, thus overlooking the well-settled rule that, in reviewing a JMOL decision, this Court "do[es] not weigh the evidence, consider the credibility of witnesses, or decide disputed facts." *Southwest Software, Inc. v. Harlequin Inc.*, 226 F.3d 1280, 1289-90 (Fed. Cir. 2000) ("We determine whether, 'viewing the evidence in the light most favorable to the non-moving party,' and giving the non-movant 'the benefit of all reasonable inferences,' there is sufficient evidence of record to support a jury verdict in favor of the non-movant.").

First, the Court improperly decided that some bipolar embodiments in the Roos References use electrically conducting fluid – a disputed fact. The Court concedes that the embodiments in Figures 1 and 5 of the Roos Patent do not use  

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at 25) (fluid used in TURP procedures "carries heat away and disperses current (even though it is non-conductive)").

electrically conducting fluid, but states that this is irrelevant because they are only “one” or “a single” embodiment. Decision at 11. There is no basis for this inference, however, because the evidence at trial showed that the Roos References describe the fluid used with *all* embodiments in the same way, never stating or suggesting that different fluids are used with different embodiments. A15513 (1350:20-1351:6); A15519 (1376:11-25). Moreover, the one bipolar embodiment that this Court identifies as using electrically conducting fluid (Figure 1 in the Roos Patent) is precisely the same embodiment that Smith & Nephew’s expert admitted did *not* use electrically conducting fluid. *Compare* Decision at 11 (citing “198 Patent col. 3, ll. 9-15” (the “plastic extension” refers to element 18 in Figure 1 of the Roos Patent)) *with* A15516-17 (1363:2-1367:21) (Smith & Nephew’s expert admitting that the embodiment of Figure 1 must have been used with non-conducting liquid). The Court’s inference is thus in conflict not only with the reasonable inference drawn by the jury but also by the evidence on which it relies.

Second, this Court improperly weighed the evidence and decided that it “is unclear” whether the fluid used in Roos’s monopolar embodiments was non-conductive—a disputed fact. Based on its resolution of conflicting evidence, the Court inferred that the Roos References disclose conductive fluid inside a patient’s



body.<sup>3</sup> Decision at 10-11. The Court's conclusion, however, is directly contrary to the undisputed evidence at trial (from Smith & Nephew's own expert) that the fluid used in all of Roos's monopolar embodiments was non-conductive. A15511 (1342:15-24); A15519 (1374:8-1376:25). The Court further overlooked the undisputed evidence (also from Smith & Nephew's expert) that the Roos References describe the fluid identically for all embodiments, both bipolar and monopolar. A15511 (1343:16-1344:6); A15519 (1375:22-1376:25). Because the Roos References show current flow through the fluid used with both the monopolar and the bipolar embodiments, and because the monopolar fluid was non-conductive and described in the same terms as the fluid used with the bipolar devices, the jury reasonably inferred that non-conductive fluid was used in all Roos embodiments. The Court improperly substituted its own inference for a reasonable jury inference.

Third, the Court improperly weighed the evidence and decided that "it would be bizarre to say that a non-conductor was introduced to 'provide electrical conductance'" – a disputed fact. Decision at 10 (citing Claim 1 of the Roos

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<sup>3</sup> On this point, the Court clearly weighed conflicting evidence and drew an inference contrary to an inference drawn by the jury (and which the District Court found entirely reasonable): "The [District] Court reasoned that because most monopolar devices use nonconducting fluid, the Roos patent does not clearly teach electrically conducting fluid. That inference, however, is contradicted by the claim language and prosecution history of the Roos patent reviewed above." Decision at 11.

Patent). The jury's decision to draw the contrary inference is not "bizarre" because there was myriad evidence before it that fluids used in TURP procedures, such as glycine and mannitol, were considered electrically non-conducting by those of skill in the art even though they provide some electrical conductance. A15517 (1366:17-20); A15519 (1374:24-1375: 9); A15520 (1377:9-1378:1). Moreover, the "provide electrical conductance" language appears in Claim 1 of the Roos Patent. The bipolar device shown in Figure 1 of the Roos Patent embodies Claim 1, A15513 (1349:23-1350:11), and it was undisputed at trial that the later-issued Roos '667 Patent stated that the neutral electrode of the Roos Patent's Figure 1 embodiment "can only enter into electrical contact with the cutting electrode electrolytically via the secretion which is present during the cutting process." A15516 (1363:2-22); A23661 (1:14-29). Based on this description, Smith & Nephew's expert agreed that Roos's "washing liquid" could not have been electrically conducting because, if it were, then "the secretion which is present during the cutting process" would not have been needed for the active and return electrodes to make electrical contact. A15517 (1365:25-1366:7). This demonstrates that a non-conductive fluid can "provide electrical conductance," just as the jury must have found.

**B. The Court Improperly Relied On A Combination of Multiple References In Finding That The Roos Patent Anticipates**

By combining the Roos Patent and the Roos Patent prosecution history to

conclude that the Roos Patent anticipates the asserted claims of the '536 Patent, the Court overlooked the rule that anticipation must be found in a single reference. "It is hornbook law that anticipation must be found in a single reference, device, or process," unless the additional reference is used to shed light on what a particular reference "would have meant to those of skill in the art." *Studiengesellschaft Kohle, M.B.H. v. Dart Indus.*, 726 F.2d 724, 726-27 (Fed. Cir. 1984).

Here, the Court explicitly stated that it was relying on the Roos prosecution history in concluding that the Roos Patent discloses electrically conducting fluid: "[t]he prosecution history of the Roos patent makes clear that the 'fluid provid[ing] electrical conductance' recited in claim 1 of the Roos patent reads on the 'electrically conducting fluid' of the '536 patent." Decision at 10. The Roos Patent and its prosecution history, however, are not a single reference. Moreover, no witness testified at trial that a person of ordinary skill would have understood that the passage from the prosecution history means that the "providing electrical conductance" language describes an electrically conducting fluid. As such, this Court's reliance on multiple references was a material mistake of law, without which this Court would not have concluded that the Roos Patent anticipates.

#### **IV. The Court Misapprehended That Smith & Nephew's Infringement Of The '882 and '592 Patents Warrants Maintaining The Injunction**

The Court should reinstate the injunction and allow the District Court to determine whether the injunction should be set aside on remand. The infringement

determinations that were not reversed by the Court—Smith & Nephew’s infringement of the ’882 and ’592 Patents—entitle ArthroCare to a permanent injunction, *see, e.g., MercExchange, LLC v. eBay, Inc.*, 401 F.3d 1323, 1338 (Fed. Cir. 2005), and that relief and protection should not be taken away absent a firm legal basis.

Rather than relying on any of the customary grounds for dissolving an injunction—legal error, overbreadth, or a failure to comply with specificity and fact-finding requirements, *see, e.g., Additive Controls & Measurement Sys., Inc. v. Flowdata, Inc.*, 986 F.2d 476, 479-80 (Fed. Cir. 1993); *Joy Techs., Inc. v. Flakt, Inc.*, 6 F.3d 770, 773 (Fed. Cir. 1993); FED. R. CIV. P. 65—the Court lifted the injunction as a matter of deference. Decision at 7-8. This is improper. Reconsideration of the injunction should be left to the District Court, which has broad discretion under 35 U.S.C. § 283 to determine the scope of injunctive relief. *See, e.g., Ortho Pharm. Corp. v. Smith*, 959 F.2d 936, 945 (Fed. Cir. 1992). Once the District Court has exercised its discretion, this Court can review that decision, should it be appealed.

#### **ARGUMENT IN SUPPORT OF REHEARING *EN BANC***

Rehearing *en banc* is necessary in this case to maintain uniformity of this Court’s decisions. FED. R. APP. P. 35(a)(1). The panel, without briefing or argument, *sua sponte* rejected the District Court’s unappealed construction of


“electrically conducting fluid” and substituted its own, inconsistent construction of the phrase. Indeed, the Court, in effect, adopted the claim construction that Smith & Nephew proposed below, that the District Court rejected after a *Markman* hearing, and that Smith & Nephew did not appeal. This is contrary to the holding of *WMS Gaming, Inc. v. Int’l Game Tech.*, 184 F.3d 1339, 1348 n.2 (Fed. Cir. 1999), that when “neither party disputes [the District Court’s] construction on appeal, we decline to raise an issue *sua sponte* that the parties have not presented.” The panel’s *sua sponte* claim construction, if allowed to stand, would set a dangerous precedent. Such *sua sponte* constructions promote error, because the Court is not presented with briefing, argument, or evidence from which to make the correct decision. They also violate well-settled doctrines of prudence and of limiting the exercise of judicial power to ripe, active disputes.

### CONCLUSION

For these reasons, the jury’s verdict that the ‘536 Patent is not anticipated should be affirmed and the District Court’s injunction should be reinstated.

Dated: May 21, 2005

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## **ADDENDUM**

# United States Court of Appeals for the Federal Circuit

04-1323, -1487

ARTHROCARE CORPORATION

Plaintiff/Counterclaim Defendant-  
Appellee,

and

ETHICON, INC.,

Counterclaim Defendant-Appellee,

v.

SMITH & NEPHEW, INC.,

Defendant/Counterclaimant-Appellant.

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DECIDED: May 10, 2005

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Before MAYER, LOURIE, and BRYSON, Circuit Judges.

BRYSON, Circuit Judge.

The term electrosurgery refers to a surgical technique in which high frequency electrical current is applied to cut or ablate body tissue. There are two forms of electrosurgical devices, monopolar and bipolar. In monopolar devices, electric current passes from a single exposed electrode into the body tissue that is to be ablated. The current then passes through the body to a return electrode, usually attached to the outside of the patient's body. In bipolar devices, both electrodes are inserted into the

body. The current passes from one electrode, through the targeted body tissue, and then back to the return electrode.

Electrosurgery has the benefit of reducing patient bleeding and trauma. However, there are disadvantages to applying high voltages within the patient's body, including the risk that the electrical discharge will cause damage other than to the target tissue. For that reason, the path of the electrical current through the body needs to be carefully controlled. Moreover, surgeons prefer to cleanse the surgical area during arthroscopic procedures with fluids that conduct electricity, such as saline. Therefore, electrosurgical devices need to be usable in such fluids. The patents at issue in this case sought to address the problems of controlling the electrical path and enabling electrosurgical instruments to function in the presence of conductive fluids.

The three patents at issue, U.S. Patent Nos. 5,697,536 ("the '536 patent"), 5,697,882 ("the '882 patent"), and 6,224,592 ("the '592 patent"), are owned by ArthroCare Corporation. ArthroCare sued Smith & Nephew, Inc., in the United States District Court for the District of Delaware claiming that Smith & Nephew was liable for infringement of those patents based on its manufacture of certain electrosurgical probes and the use of those probes in surgery. In response, Smith & Nephew filed a counterclaim alleging that ArthroCare and Ethicon, Inc., had violated the antitrust laws by entering into a conspiracy in restraint of trade. Smith & Nephew's theory of antitrust liability was that ArthroCare and Ethicon had settled an earlier dispute in a manner designed to restrain other competitors from entering the market for electrosurgical devices and that ArthroCare had brought this action, although knowing it to be



objectively baseless, as part of an unlawful conspiracy with Ethicon to interfere with Smith & Nephew's business.

Before trial, the district court bifurcated the case. The first phase encompassed the patent issues of infringement, invalidity, and inequitable conduct. The second phase addressed damages, willfulness, and the antitrust counterclaim. The court stayed the second phase until after completion of the trial on the first.

At the conclusion of the patent trial, the jury determined that Smith & Nephew had directly or indirectly infringed the three patents and that none of the patents were invalid. Smith & Nephew then moved for judgment as a matter of law and a new trial. ArthroCare meanwhile moved to dismiss Smith & Nephew's antitrust counterclaim for failure to state a claim upon which relief could be granted. Before Smith & Nephew's response to that motion was due, the district judge stayed all proceedings on the antitrust counterclaim while she considered Smith & Nephew's motions for judgment as a matter of law and a new trial. The court eventually denied Smith & Nephew's motions and entered a permanent injunction against Smith & Nephew. ArthroCare Corp. v. Smith & Nephew, Inc., 310 F. Supp. 2d 638, 681 (D. Del. 2004). On the same day, the court granted ArthroCare's motion to dismiss the antitrust counterclaim before Smith & Nephew responded to the motion. Smith & Nephew sought reconsideration of the dismissal order, but the court denied the motion for reconsideration. ArthroCare Corp. v. Smith & Nephew, Inc., 315 F. Supp. 2d 615, 618 (D. Del. 2004). In denying reconsideration, the court stated that the order staying proceedings on the antitrust counterclaim had stayed only discovery and trial of the counterclaim and did not affect the motion to dismiss. The court further stated that Smith & Nephew's reliance on a

statement by the court in a June 2003 telephone conference was misplaced, and that if Smith & Nephew “believed that ArthroCare’s motion [to dismiss] was premature and inconsistent with” the court’s stay order, it should have indicated so, presumably in a more formal manner. Id. at 318 n.3. The court added that it was “not persuaded that any argument from Smith & Nephew about the basis for its antitrust allegations will change the court’s decision.” Id. at 319.

I

On appeal, Smith & Nephew first argues that the district court erred in dismissing the antitrust counterclaim without giving it an opportunity to respond to the motion to dismiss or to amend its counterclaim. Following the trial on the patent issues, the district court continued the stay of the antitrust proceedings pending the disposition of Smith & Nephew’s motions for judgment as a matter of law and a new trial, and ArthroCare’s request for an injunction. After the court ruled on those matters, however, the court dismissed the antitrust counterclaim even though it had not received a response to the motion to dismiss from Smith & Nephew. The court noted that Smith & Nephew had not filed a response to the motion and from its silence “presume[d] that Smith & Nephew does not oppose the motion.” Moreover, the court concluded that the “sham litigation” aspect of Smith & Nephew’s antitrust counterclaim was baseless. The court did not address the other ground for the antitrust counterclaim, namely, the allegation that ArthroCare and Ethicon had entered into a settlement of their dispute that was designed to exclude other competitors, including Smith & Nephew, from the relevant market.

Smith & Nephew contends that, because of the stay of proceedings on the antitrust counterclaim, it never had an opportunity to respond to the motion to dismiss. In the absence of an opportunity to respond, Smith & Nephew contends that it was error for the court to grant the motion to dismiss.

In its opinion on reconsideration, the district court characterized the pretrial order staying proceedings on the antitrust counterclaim as staying discovery and trial but not the motion to dismiss. While it is true that the written stay order referred only to discovery and trial, the court elaborated on that order in a June 9, 2003, telephone conference, in which the court stated that proceedings on the pending motion to dismiss the antitrust counterclaim were stayed. In response to a question about the pending motion to dismiss, the court stated that "everything is stayed and we'll deal with the antitrust issues later. . . . So the pending motion [to dismiss] on antitrust is stayed and everything having to do with the antitrust counterclaims, discovery, substantive motions, et cetera, is stayed pending further order of the court." In light of that colloquy, it was reasonable for Smith & Nephew to conclude that the stay order extended to the proceedings on the motion to dismiss and that it would not be required to respond to the dismissal motion until the stay was lifted. Thus, the effect of this sequence of events was that the court granted ArthroCare's motion to dismiss the antitrust counterclaim without giving Smith & Nephew an opportunity to respond to the motion.

The Supreme Court has stated that under Rule 12(b)(6) of the Federal Rules of Civil Procedure, "a plaintiff with an arguable claim is ordinarily accorded notice of a pending motion to dismiss for failure to state a claim and an opportunity to amend the complaint before the motion is ruled upon." Neitzke v. Williams, 490 U.S. 319, 329

(1989). The purpose of such a procedure is to enable the plaintiff “meaningfully to respond by opposing the motion to dismiss on legal grounds or by clarifying his factual allegations so as to conform with the requirements of a valid legal cause of action.” Id. at 329-30. Providing the plaintiff with an opportunity to respond “crystallizes the pertinent issues and facilitates appellate review of a trial court dismissal by creating a more complete record of the case.” Id. at 330.

The Third Circuit, whose law applies to this procedural issue, has extended that principle by adopting a categorical rule that “a Rule 12(b)(6) motion for dismissal . . . may be disposed of only after a hearing, which affords an opportunity to present legal arguments either orally, in writing, or both at the District Court’s discretion.” Dougherty v. Harper’s Magazine Co., 537 F.2d 758, 761 (3d Cir. 1976); see also Oatess v. Sobolevitch, 914 F.2d 428, 430 n.5 (3d Cir. 1990) (a district court may not dismiss a complaint under Rule 12(b)(6) sua sponte without giving the plaintiff a chance to respond). In this case, Smith & Nephew did not have an opportunity to respond to the motion to dismiss, in contravention of that rule.

ArthroCare and Ethicon claim that Smith & Nephew was given the opportunity to contest the motion to dismiss in the form of its motion for reconsideration, which the district court denied. That argument is flawed for several reasons. In Dougherty, the plaintiff also petitioned the district court for reconsideration, yet the Third Circuit reversed the district court for dismissing the case without giving the plaintiff an opportunity to respond. 537 F.2d at 761; see also Jordan v. County of Montgomery, Pa., 404 F.2d 747, 748 (3d Cir. 1969) (finding that “the district court erred in dismissing [the plaintiff’s] complaint on the defendants’ motions without affording him an

opportunity to submit a written statement in opposition to the motions” even though the plaintiff made a motion for relief from judgment under Rule 60(b)(1)). Additionally, when it denied Smith & Nephew’s motion for reconsideration, the district court did not conduct a de novo analysis of the motion to dismiss, but instead applied the highly restrictive standard applicable to reconsideration motions. See ArthroCare, 315 F. Supp. 2d at 618. The reconsideration process thus did not satisfy the requirement that Smith & Nephew be given the opportunity “meaningfully to respond” to the motion to dismiss.

On the merits, ArthroCare and Ethicon argue that Smith & Nephew’s counterclaim should fail because the claim does not describe the antitrust injury sufficiently and does not provide enough specificity in describing the antitrust violation. Third Circuit precedent indicates, however, that if a claim fails for lack of specificity, the district court should grant leave to amend the complaint, regardless of whether the complainant asks for it. Shane v. Fauver, 213 F.3d 113, 116 (3d Cir. 2000); Borelli v. City of Reading, 532 F.2d 950, 951 n.1 (3d Cir. 1976). The court should dismiss only if the complainant is unable or unwilling to amend the complaint. Dist. Counsel 47 v. Bradley, 795 F.2d 310, 316 (3d Cir. 1986). We therefore vacate the district court’s dismissal of the antitrust counterclaim and direct the court to allow Smith & Nephew to respond to the motion to dismiss. If the court concludes, as urged by ArthroCare and Ethicon, that Smith & Nephew’s antitrust counterclaim fails for lack of specificity, Smith & Nephew should be given the opportunity to amend.

Because we dispose of the counterclaim issue on a procedural ground, we take no position on the merits of the counterclaim. However, we note that the district court did not intend to issue a permanent injunction until after it disposed of the antitrust

counterclaim. Because the district court must reconsider that counterclaim on remand, the permanent injunction against Smith & Nephew must be vacated pending the disposition of the antitrust counterclaim. See Tegal Corp. v. Tokyo Electron Am., Inc., 257 F.3d 1331, 1351 (Fed. Cir. 2001).

## II

Smith & Nephew next appeals the denial of its motion for judgment as a matter of law that the asserted claims of the '536 patent (claims 46, 47, and 56) were anticipated by a prior art patent, U.S. Patent No. 4,116,198 ("the Roos patent" or "the '198 patent"), and an article by the inventor of that patent, Eberhard Roos and a co-author, E. Elsässer.

As an initial matter, ArthroCare argues that Smith & Nephew is precluded from arguing invalidity on appeal. ArthroCare maintains that Smith & Nephew did not specify the basis on which it sought judgment as a matter of law after presenting its evidence at trial, as required by Rule 50 of the Federal Rules of Civil Procedure. Because of that failure, ArthroCare claims that Smith & Nephew may not assert invalidity now. That argument has no merit, however, because the district judge acknowledged that she precluded argument on the motions for judgment as a matter of law at trial and indicated that Smith & Nephew's rights were preserved.

On the merits, the '536 patent is directed to an electrosurgical system. The three asserted claims of the '536 patent all recite an electrosurgical probe "comprising a shaft having a proximal end and a distal end, an electrode terminal disposed near the distal end, and a connector near the proximal end of the shaft electrically coupling the electrode terminal to the electrosurgical power supply." The claims also recite "an

electrically conducting fluid supply for directing electrically conducting fluid to the target site such that the electrically conducting fluid generates a current flow path between the return electrode and the electrode terminal.” ArthroCare maintains that neither the Roos patent nor the Roos and Elsässer article teaches either an electrically conducting fluid or an electrosurgical probe with a connector at the proximal end connecting the probe to the power supply. We disagree and hold that the evidence at trial clearly established that the prior art references disclose both of those features.

A

With respect to the “electrically conductive fluid” limitation, claim 1 of the Roos patent recites that the claimed electrode is “adapted to be filled with liquid to provide electrical conductance.” ’198 patent, col. 7, ll. 60-62. ArthroCare posits that there is a legally tenable distinction between a fluid that provides electrical conductance and “an electrically conducting fluid.” In particular, ArthroCare argues that while all materials provide some electrical conductance, most do not possess a sufficiently high level of conductivity for a person of skill in the art to consider them “electrically conductive.”

ArthroCare’s distinction is belied by the description of “electrically conducting fluid” in the ’536 patent and by the prosecution history of the Roos patent, which together make clear that both patents recite a fluid that provides a path for the electrical current between the electrodes of the electrosurgical devices. The ’536 patent explains that the conducting fluid provides a “current flow path between the target site and the return electrode.” ’536 patent, col. 3, ll. 27-30; id., col. 7, ll. 35-46. The inventor of the ’536 patent affirmed that he used the term “conducting fluid” in the ’536 patent to indicate that the fluid “provides the pathway between the active electrode or electrodes,

plural, and the return electrode.” Furthermore, the description of the fluid in the patent indicates that the conducting fluid facilitates the passage of current by providing a low electrical impedance current path between the two electrodes. Id., col. 7, ll. 40-43.

The prosecution history of the Roos patent makes clear that the fluid “provid[ing] electrical conductance” recited in claim 1 of the Roos patent reads on the “electrically conducting fluid” of the ’536 patent. The Roos patent prosecution history notes that the washing fluid recited in claim 1 of the Roos patent must “provide the necessary electrical conductor” between the electrodes and that “there is always a well-defined current path . . . through the washing (and tissue) fluid.” Thus, the Roos patent describes a fluid that creates a “current flow path.” That description of the fluid makes sense given the language of claim 1 of the Roos patent, which recites that the liquid “provides electrical conductance between said electrodes.” That language means that the fluid is introduced during electrosurgery to provide conductance and to help generate a “current flow path.” While it is true that, given enough voltage, an electrical current can be made to flow through any substance, it would be bizarre to say that a non-conductor was introduced to “provide electrical conductance.” Consequently, we conclude that the Roos patent discloses an electrically conducting fluid.

The district court provided three reasons for concluding that the Roos patent does not teach an electrically conducting fluid. First, the court reasoned that the Roos patent does not disclose such a fluid because it does not list either saline or Ringer’s lactate as an example of an electrically conducting fluid. That rationale is unconvincing, however, because there is no requirement that an anticipating reference must provide specific examples; rather, the reference need only “be enabling and describe the



applicant's claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention." In re Paulsen, 30 F.3d 1475, 1479 (Fed. Cir. 1994). Second, the district court focused on the fact that the Roos patent specification does not distinguish between the fluid used in monopolar devices and the fluid used in bipolar devices. The court reasoned that because most monopolar devices use nonconducting fluid, the Roos patent does not clearly teach conducting fluid. That inference, however, is contradicted by the claim language and prosecution history of the Roos patent reviewed above. Finally, the court looked to an embodiment described in the Roos patent in which the probe touches the tissue. The court concluded that there would be no need for electrical contact with the patient's tissue if the fluid were conducting. The court's analysis, however, focused on only one embodiment in the Roos patent. There are other embodiments in the patent as to which it is clear that no such direct contact is necessary, see, e.g., '198 patent, col. 3, ll. 9-15, and it was error for the district court to limit the disclosure of the prior art reference to a preferred embodiment. See Ultradent Prods., Inc. v. Life-Like Cosmetics, Inc., 127 F.3d 1065, 1068 (Fed. Cir. 1997). ArthroCare makes a similar point, contending that another embodiment described in the Roos patent uses non-conducting fluid. In support of its argument, ArthroCare points to a later patent by Roos, which describes the foreign patent to which the Roos patent claimed priority. Like the district court's analysis, however, ArthroCare's argument fails because it addresses only a single embodiment in the Roos patent.

The Roos and Elsässer article also teaches an electrically conducting fluid. The article describes how problems with prior art monopolar devices can be eliminated by

providing "the high-frequency current a path . . . offering such low resistance that aberrant currents or leakage currents do not even occur." The article describes a way of accomplishing that goal by placing a neutral electrode close to the active electrode in an irrigation liquid so that current flows through the liquid. The article states that creating such a current path with the irrigation liquid creates "very good electrical conditions." Furthermore, the diagrams in the Roos and Elsässer article depict current "directly flowing" along a path through the fluid. The description of the role of the irrigation liquid is quite similar to the description of the role of the conducting fluid in the '536 patent, which is to provide a "current flow path between the target site and the return electrode." '536 patent, col. 3, ll. 27-30.

ArthroCare maintains that the article does not teach an electrically conducting fluid because the article uses the term "irrigation liquid" in describing the liquid used in both the bipolar and the monopolar procedures. As we have noted, most monopolar procedures use nonconducting fluids. Because the article does not use different names for the liquids used in the two procedures, ArthroCare contends that there is no way of knowing if the irrigation liquid is a conducting fluid. ArthroCare's argument fails, however, because the article pays little attention to the nature of the irrigation liquid used in the monopolar prior art. It is unclear whether the liquid in the monopolar procedure is nonconductive or whether it is even the same liquid that is used in the bipolar case. What is clear is that, in describing bipolar devices, the Roos and Elsässer article describes the liquid as providing a path for the current, thus serving as a conducting fluid. Even giving ArthroCare the benefit of all reasonable inferences, the

fact that the article uses the same term to refer to the fluid in both procedures does not justify an inference that the fluid described in the bipolar procedure is nonconductive.

B

ArthroCare also maintains that the Roos patent and the Roos and Elsässer article do not disclose “a connector near the proximal end of the shaft for electrically coupling the electrode terminal to the electrosurgical power supply.” Both the patent and the article clearly show that the electrodes are coupled to a power source. See, e.g., ’198 patent, col. 5, ll. 30-35. Hence, in arguing that the prior art does not anticipate, ArthroCare focuses on the term “connector near the proximal end.” However, both the Roos patent and the article disclose such a connector.

The Roos patent states that the claimed invention relates to an electrosurgical device with electrodes and “an insulated cable which can be passed through an endoscope, to which can be connected the pole of a high frequency generator.” ’198 patent, col. 1, ll. 5-15; see also id., col. 7, ll. 50-51. The district court construed the term “connector” to mean “a structure that electrically links the electrode terminal to the high frequency power supply.” The insulated cable in the Roos patent does exactly that. Specifically, Figure 4 of the Roos patent provides a schematic diagram for the electrosurgical probes in the patent, and it illustrates that the electrodes are connected via “output lines” to a high frequency generator. See id., col. 5, ll. 8-9; id., col. 5, ll. 35-36.

On appeal, ArthroCare appears to accept the district court’s construction of the term “connector,” but it asserts that the jury could have rejected the contention that a wire is a connector for the purposes of the ’536 patent. ArthroCare raises various

arguments concerning whether a wire is a connector, but those arguments miss the point. The district court stated that a connector is a "structure" that electrically links the electrodes and the power supply. That construction of the term "connector" easily encompasses a wire between the electrodes and the power supply. Because ArthroCare does not dispute the district court's construction, ArthroCare's attempt to distinguish "wires" from "connectors" fails. The Roos patent clearly depicts a connector under the district court's construction.

Furthermore, the Roos patent indicates that the electrical wires that connect the electrodes to the power source pass through the probe. The specification of the Roos patent describes one embodiment as having the two electrical leads to the electrodes "pass outwards from the cylindrical neutral electrode 11, which at 20 are combined to form a single cable, leading to the rear end of the endoscope 13." '198 patent, col. 7, ll. 3-5. In other words, the electrical leads attach to the power source from near the proximal end of the endoscope. While Smith & Nephew's expert agreed that the Roos patent does not explicitly identify the point at which the wires exit the probe, he stated that a person of skill in the art would understand that the wires would be attached to the power source after exiting the back end of the probe. See Helifix Ltd. v. Blok-Lok, Ltd., 208 F.3d 1339, 1347 (Fed. Cir. 2000) (even if a piece of prior art does not expressly disclose a limitation, it anticipates if a person of ordinary skill in the art would understand the prior art to disclose the limitation and could combine the prior art description with his own knowledge to make the claimed invention).

A "connector near the proximal end" of the electrosurgical probe is also found in the Roos and Elsässer article. In Figure 8 of the article, the electrosurgical probe is

drawn in cross-section. The figure shows the active and neutral probes attached to wires, and the labels state that those wires go to the power supply. Therefore, a connector is disclosed in the Roos and Elsässer article as well. Moreover, Figure 10 of the article illustrates how those wires leave the probe. That figure is a schematic diagram, which depicts the cutting and neutral electrodes inside the body and projecting from the “resectoscope shaft” on one end. The wires also project from the other end of the shaft, where they connect to a high frequency power source. Thus, the connectors are shown exiting near the proximal end of the probe. The article even provides a photograph of the instrument depicted in Figure 10. The photograph verifies that the electrical leads leave the probe at its back end. In contending that the article does not disclose a connector near the proximal end of the probe, ArthroCare limits its argument to contesting the veracity of Smith & Nephew’s expert and disputing his conclusions regarding the presence of the electrical connector in the article. However, the article speaks for itself, and it clearly discloses such a connector.

In sum, Smith & Nephew has proved by clear and convincing evidence that the asserted claims of the ’536 patent were anticipated either by the Roos patent or the Roos and Elsässer article. Because the jury’s determination that the ’536 patent was not invalid is not supported by substantial evidence, we reverse the district court’s denial of Smith & Nephew’s motion for judgment as a matter of law on that issue.

### III

Smith & Nephew also appeals the denial of its motion for judgment as a matter of law that the ’882 patent is invalid because the claims of that patent were impermissibly broadened by a certificate of correction. In particular, Smith & Nephew argues that

claim 1 of the '882 patent required three electrodes when it was originally issued, but that after the correction the claim required only two electrodes. Smith & Nephew contends that the change impermissibly broadened the patent's scope.

When ArthroCare originally filed the application that matured into the '882 patent, the claims recited only an "active electrode" and a "return electrode." Before any examination on the merits, ArthroCare changed the claims by making what it termed "a few minor amendments." Those amendments changed the term "active electrode" to "electrode terminal" in three places in claim 1 of the application, but did not make the change in a fourth place, where the term "active electrode" was left unchanged. The prosecuting attorney noted the error on the same day that the patent issued and immediately asked the Patent and Trademark Office to change the remaining reference from "active electrode" to "electrode terminal." The prosecuting attorney testified at trial that the change listed in the certificate of correction was made solely due to a typographical error. Smith & Nephew did not attempt to rebut that evidence.

The correction of a ministerial error in the claims, which also serves to broaden the claims, is allowable if it is "clearly evident from the specifications, drawings, and prosecution history how the error should appropriately be corrected" to one of skill in the art. Superior Fireplace Co. v. Majestic Prods. Co., 270 F.3d 1358, 1373 (Fed. Cir. 2001). At trial, Smith & Nephew sought to show that the requisite standard was not met in the case of the correction to the '882 patent. Smith & Nephew's proof on that issue failed to satisfy the jury, and we hold that substantial evidence supports the verdict.

In the first place, claim 1 of the '882 patent does not make sense if it is interpreted to contain three types of electrodes instead of two. The claim requires that

an electrode terminal and a return electrode be coupled to a high voltage source. The claim as originally issued then required that an "active electrode" be placed in close proximity to the target site. High frequency voltage is then applied between the electrode terminal and the return electrode, which induces the discharge of energy to the target site. Nothing in the patent suggests any reason to place a third type of electrode close to the target site. The whole point of the patent is to use the electrode terminal and return electrode to apply a voltage across the tissue; a third type of electrode would serve no apparent purpose. Moreover, the specification refers to "electrode terminal" and "active electrode" interchangeably. See '882 patent, col. 20, ll. 19-21; id., col. 20, ll. 53-54. That evidence indicates that it was clear how the typographical error in the original claims should have been corrected.

The prosecution history further supports ArthroCare's argument that it was unambiguous how the remaining reference to an active electrode in claim 1 should be changed. From the beginning, the claims referred to only two electrodes. The change of the term "active electrode" to "electrode terminal" was made before any examination on the merits, and the uncontroverted evidence establishes that it was meant to be a global renaming. In fact, most of the references to "active electrode" in the claims were changed. Finally, ArthroCare presented unrefuted testimony from an expert who stated that he understood the term "active electrode" in the uncorrected claim to refer to the "electrode terminal."

Smith & Nephew's only evidence that it remained unclear how to fix the error in claim 1 is that claim 53, which depends on claim 1, also refers to "the active electrode." According to Smith & Nephew, that evidence implies that it cannot be apparent how to

fix the remaining instance of "active electrode" in claim 1, because changing it to "electrode terminal" would leave claim 53 without an antecedent basis. In fact, however, a simple explanation for the use of the term "active electrode" in claim 53 is that the prosecuting attorney made another error in claim 53 of the same type that was corrected in claim 1. The prosecuting attorney's failure to replace the term "active electrode" twice in the claims, instead of once, does not demonstrate by clear and convincing evidence that a person of ordinary skill in the art would not understand how to correct those errors. Accordingly, substantial evidence supports the jury's conclusion that the certificate of correction was valid. We therefore affirm the district court's denial of judgment as a matter of law of invalidity of the '882 patent.

#### IV

Finally, Smith & Nephew appeals the denial of its motion for judgment as a matter of law that it was not liable for indirect infringement of the '592 patent. The '592 patent pertains to a method for conducting electrosurgery. The method comprises positioning an electrode terminal near the target site in the presence of an electrically conductive fluid. Next, a return electrode is positioned in the fluid, while ensuring "that the return electrode is not in contact with the body structure." '592 patent, col. 24, ll. 13-14. Finally, high frequency voltage is applied between the electrode terminal and the return terminal so as to force current to flow into the target site. Smith & Nephew argues that it is not liable for contributory infringement or inducement of infringement of the '592 patent, because there was no evidence that its probes were ever used in a manner that directly infringed the patented method. Smith & Nephew maintains that none of the videotaped surgical procedures using its probes infringed the patented



method because in every case the return electrode was shown touching “the body structure.” Smith & Nephew asserts that the jury erred in finding infringement because ArthroCare convinced the jury to disregard the district court’s claim construction.

In construing the claims of the ’592 patent, the district court instructed the jury that the return electrode “is not to contact the body at all during the performance of the claimed method.” The court noted, however, that “[t]he claimed method does not contain any time limitations. Thus, the claimed method is performed when each of the three steps of the claim has been completed.” Smith & Nephew does not challenge that claim construction.

Based upon the district court’s claim construction, the jury was free to find infringement if it concluded that the return electrode did not touch the body when each step of the patented method was being performed. There was no need for the electrode to be kept apart from the body throughout the entire surgical procedure; nothing in the claim language or in the court’s claim construction required that the electrode not touch the body at any time between the performance of the steps of the claimed process. That is in effect what the district court advised the jury when it instructed that the claimed method does not contain time limitations and that the claimed method is performed when each of the three steps is completed.

Smith & Nephew interprets the court’s claim construction to require that the return electrode never touch the body until all the claimed steps are completed. That interpretation, however, is not faithful to the claim construction that the trial court adopted, and it is not a convincing interpretation of the claim language. When the district court construed the claim language at issue here, it rejected Smith & Nephew’s

proposed construction, which was that the return electrode must never touch the body at any time during the surgery. The court properly rejected that proffered claim construction on the ground that it imposed an unclaimed temporal requirement on the method. In effect, Smith & Nephew is now advancing that rejected claim construction, while maintaining that it has accepted the district court's construction. We uphold the district court's claim construction and reject Smith & Nephew's argument that the court's construction was actually a version of the very construction that the court rejected before trial.

Substantial evidence at trial showed that Smith & Nephew's probes were used so that the return electrode did not touch the body at a time when all the other claim limitations were met. ArthroCare's expert stated that during surgery "the return electrode is positioned back . . . so that you try to make sure that it's not in contact" with the body. Even Smith & Nephew's expert admitted that there were instances in which the return electrode was not in contact with the body during certain steps of the claimed method. Additionally, upon viewing the videotaped electrosurgeries, project managers for two of Smith & Nephew's accused probes admitted that the return electrodes were not in contact with body tissue during use.

There was also strong circumstantial evidence that Smith & Nephew's probes were used in an infringing manner, and that Smith & Nephew induced users to employ the probes in that way. Smith & Nephew's witnesses confirmed that the return electrodes of the accused probes were not designed or intended to contact the body tissue when power was being applied to the device. That evidence was supported by testimony from ArthroCare's expert. Moreover, the sales literature accompanying one

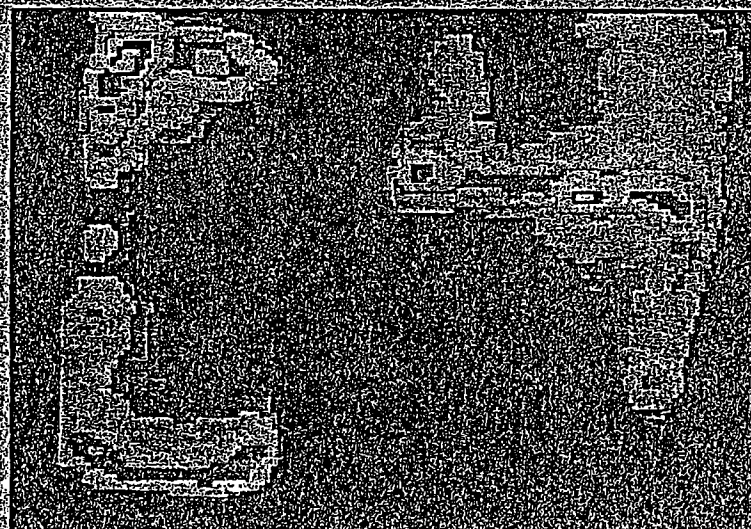
of the accused devices instructs surgeons that “care should be taken to prevent tissue contact with the return electrode.” That literature explains why the surgeon should avoid touching the return electrode to the body tissue. Even though the return electrode on the accused probe is enlarged so as to lower the return current density and thus reduce the risk of burns, the return electrode of the Smith & Nephew device was still not supposed to touch the body during the application of power because “[w]hile it will not be as hot as the active electrode at the distal tip, the return electrode may become heated. For this reason, it is important to avoid inadvertent contact with the tissue.” Instruction manuals for the other accused probes similarly confirm that the return electrode should be completely surrounded by or immersed in saline during use. Thus, substantial evidence supports the jury’s determination that Smith & Nephew indirectly infringed the claimed method. We therefore affirm the district court’s denial of judgment as a matter of law with respect to the ’592 patent.

Each party shall bear its own costs for this appeal.

AFFIRMED IN PART, REVERSED IN PART, VACATED IN PART, and REMANDED.

# Electrosurgery

John A. Pearce



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# Electrosurgery

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## 24 Clinical applications

issues are among the fastest-healing of the body. Electrosurgery plays an important role in oral surgery in that it drastically reduces bleeding (which would obscure the operative field) and the undesirable, post-operative effects of pain, edema and swelling in the submaxillary triangle [6]. It can be quite difficult to accurately resect redundant tissue masses in the oral cavity by cold scalpel techniques. Electrosurgery allows accurate resection with minimal elapsed time and complications, an important feature when fitting prosthodontic devices. Electrosurgery reduces the hazard of transient bacteremia and secondary infection [5] and the danger of surgical or mechanical metastasis of malignant tumor emboli during biopsy [6]. In short, all of the advantages obtained in other types of surgery, as well as some additional beneficial aspects, are experienced in dental surgery.

The active electrodes used in dental electrostrosy are for the most part similar to those shown in Fig. 2.1. Several shapes specific to dental procedures are shown in Fig. 2.5: the open hook electrodes in Fig. 2.5(a) are used along with other needle electrodes to create subgingival troughs; those in 2.5(b) are used with ball electrodes and loop electrodes for seating orthodontic appliances and denture prostheses and exposing roots. Other

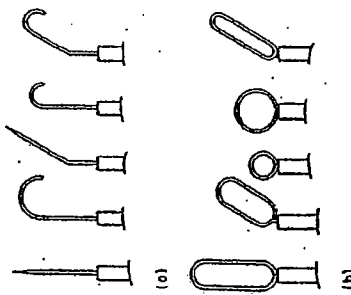


Fig. 2.5 Typical dental electrodes. (a) Open hooks and needle electrodes are used in straight and angulated forms to reach difficult locations; (b) Cutting loops in a variety of diameters and aspect ratios are also used.

interesting applications include the removal of pre-malignant neoplastic lesions from the surface of the mucosa using a planing loop and the removal of tissue masses from the tongue. Carefully applied electrostrosy can be used to advantage on teeth as well as the soft tissues of the oral cavity.

According to Malone [5], in dental surgery the advantages of electrostrosy over blade surgery include:

1. The ease of access to otherwise unreachable areas.
2. The smoothness of the margin of resected tissue is superior when electrostrosy is used.
3. Electroplaning techniques are effective and unique to electrostrosy.
4. The excision is cleaner and it is easier to find landmarks while cutting.
5. Many procedures can be completed in one office visit which would require two or more visits with conventional scalpel methods.

## 2.4 UROLOGIC SURGERY

Electrosurgery is used extensively in urologic procedures. As will be discussed in Chapter 3, urologic procedures, specifically transurethral resections of the prostate, utilize by far the highest currents at high voltage for the longest durations and largest number of activations per procedure of any electrostrosy technique. Other urologic applications of electrostrosy include the resection of bladder tumors, polyp removal by means of a snare electrode or desiccating needle, kidney resection to remove a stone-bearing pocket and enlarging the urethral orifice in order to pass stones. These procedures utilize power levels similar to those of general surgery.

A transurethral resection is intended to increase the caliber of a urethra which has been partially closed by an enlarged prostate gland. This procedure is one of the earliest applications of electrostrosy in urology, and was described in considerable detail by Kelly and Ward in 1932 [1]. During transurethral resection the urethra is irrigated with a non-conductive sterile solution, either dextrose or glycine, while a cutting loop is advanced to remove the encroaching tissue. Surgical cutting accomplished in a liquid medium requires higher currents since the liquid carries heat away and disperses the current (even though it is non-conductive) more than a gaseous environment would.

The liquid irrigation medium must be isotonic in order to prevent its absorption into the circulation. Distilled water at very low pressure may be used to facilitate cystoscopy; however, more head pressure is required during electrostrosy to provide adequate flow for irrigation. If distilled water is used, the osmotic and head pressure may combine to give undesirable absorption of water into the bloodstream. Dilution of the plasma reduces its osmolality and causes extreme pressure gradients across the membrane of red cells, resulting in their rupture. Hemolysis of erythrocytes and subsequent tubular damage is a common complication of distilled water absorption [2]. Glycine is not absorbed, but is fairly expensive when used once-through as an irrigant. Isotonic sugar solutions, of which dextrose is an example, prevent water absorption, but may become

## CERTIFICATE OF SERVICE

I hereby certify that on May 21, 2004, I caused two copies of the foregoing Combined Petition For Panel Rehearing And Rehearing *En Banc* By Plaintiff/Counterclaim Defendant-Appellee ArthroCare Corporation to be served by Federal Express to the counsel listed below:

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Executed on May 21, 2004 at Redwood Shores, California. I declare under penalty of perjury that the foregoing is true and correct.

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Perry Clark